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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/661,793
Filing Date: September 12, 2003
Appellant(s): KAO ET AL.

Mark J. Marcelli
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 28th, 2009 appealing from the Office action mailed July 02nd, 2009.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The brief does contain a statement identifying there are no appeals and interferences which will directly affect by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendment After Final

The Appellants' statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

Appellants' statement of the grounds of rejection is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the evidence (e.g., patents publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

Sahin et al. U.S. Pub. 2003/0220708 A1 November 27, 2003

(9) Grounds of Rejection

The followings ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 8-11 and 15-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Sahin et al. (U.S. Patent 2003/0220708).

In re claim 8, **Sahin** discloses a system for creation of an opening of controllable format through a layer of insulation material, comprising:

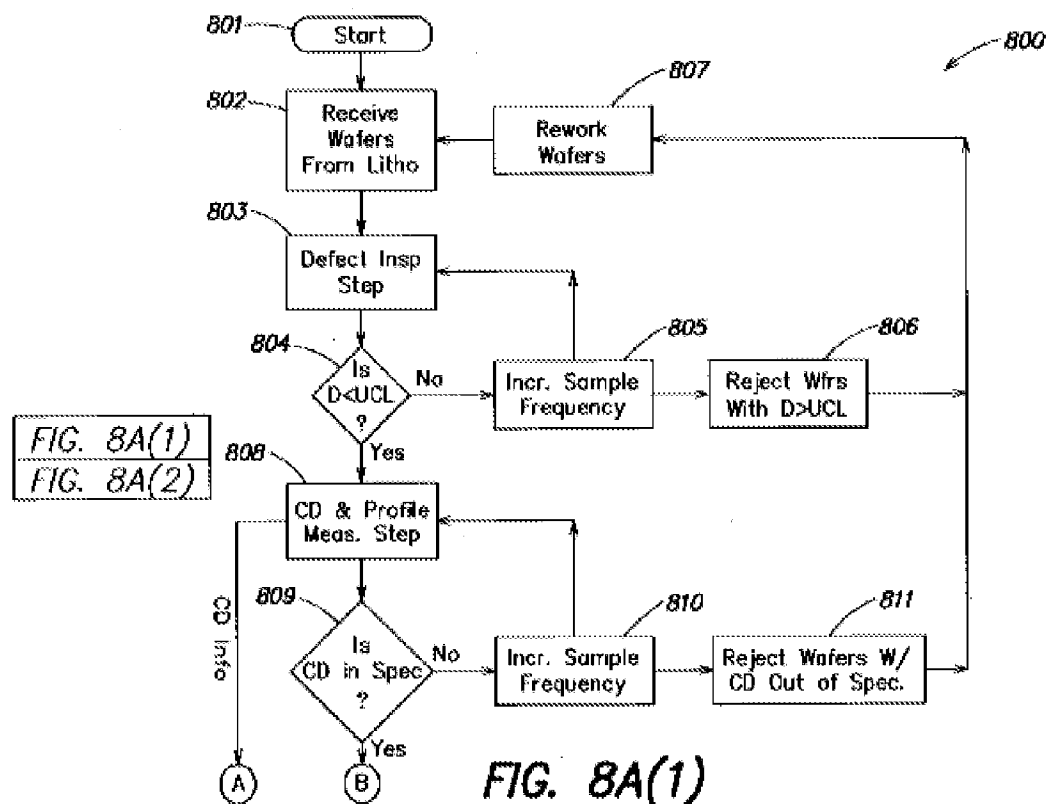
means **102** for creating an opening **710a**, **710b** through a layer of etch resist material **708** provided over the surface of a layer of insulating material **704/706** having been deposited over the surface of a substrate **702** (see page 11, paragraphs [0150]-[0152] and FIGS. 7A-C);

means for measuring an obtained critical dimension measurement of the opening **710a**, **710b** created through the layer of etch resist material **708** (see page 16, paragraph [0207] and step 803 in FIG. 8A(1));

means, including a feedback mechanism (see page 12, paragraph [0166]), for assuring that the obtained critical dimension measurement of the opening

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created through the layer of etch resist material **708** is within design specification (see page 16, paragraph [0210] and step **809** in FIG. 8A(1)), the feedback mechanism communicating with the means for creating an opening through a layer of etch resist material **708** to control the critical dimension (CD) measurement of the opening **710a**, **710b** by implementing corrections (see step **807**) in the means for creating an opening through a layer of etch resist material (see page 6, paragraph [0211] and steps **807** and **810** of FIG. 8A(1));



means for creating an opening **710a**, **710b** through the layer of insulation material **704/706**, whereby a diameter of the opening **710a**, **710b** through the layer of insulation material **704/706** is dependent on a diameter of the opening

710a, 710b created through the layer of etch resist material **708** (see page 17, paragraphs [0214]-0215); and

means, including a feedback mechanism, for assuring that the opening **710a, 710b** created through the layer of insulation material **704/706** is within design specification (see page 17, paragraphs [0216]-[0219]).

In re claim 9, as applied to claim 8 above, **Sahin** discloses all claimed limitations including the limitation wherein means, including a feedback mechanism (see page 12, paragraph [0166]), for assuring that an obtained critical dimension measurement of the opening **710a, 710b** created through the layer of etch resist material **708** is within design specification comprising (see page 16, paragraph [0210] and step **809** in FIG. 8A(1)): means for linking to a software supervisory function, thereby including data transmission functions, means for linking to a software function equally being linked to a software supervisory function, thereby including data transmission functions; means for data manipulating capabilities, thereby including manipulating interdependent data ; means for interfacing with semiconductor equipment, thereby including equipment functioning in a supporting role to the semiconductor equipment; and means for creating instructions for the semiconductor equipment, thereby including equipment functioning in a supporting role to the semiconductor equipment (see page 6, paragraph [0094]).

In re claim 10, as applied to claim 8 above, **Sahin** discloses all claimed limitations including the limitation wherein means for assuring that the opening

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710a 710b created through the layer of insulation material **704/706** is within design specification comprising: means for linking to a software supervisory function , thereby including data transmission functions, means for linking to a software function equally being linked to a software supervisory function, thereby including data transmission functions; means for data manipulating capabilities, thereby including manipulating interdependent data; means for interfacing with semiconductor equipment, thereby including equipment functioning in a supporting role to the semiconductor equipment; and means for creating instructions for the semiconductor equipment, thereby including equipment functioning in a supporting role to the semiconductor equipment (see page 6, paragraph [0094]).

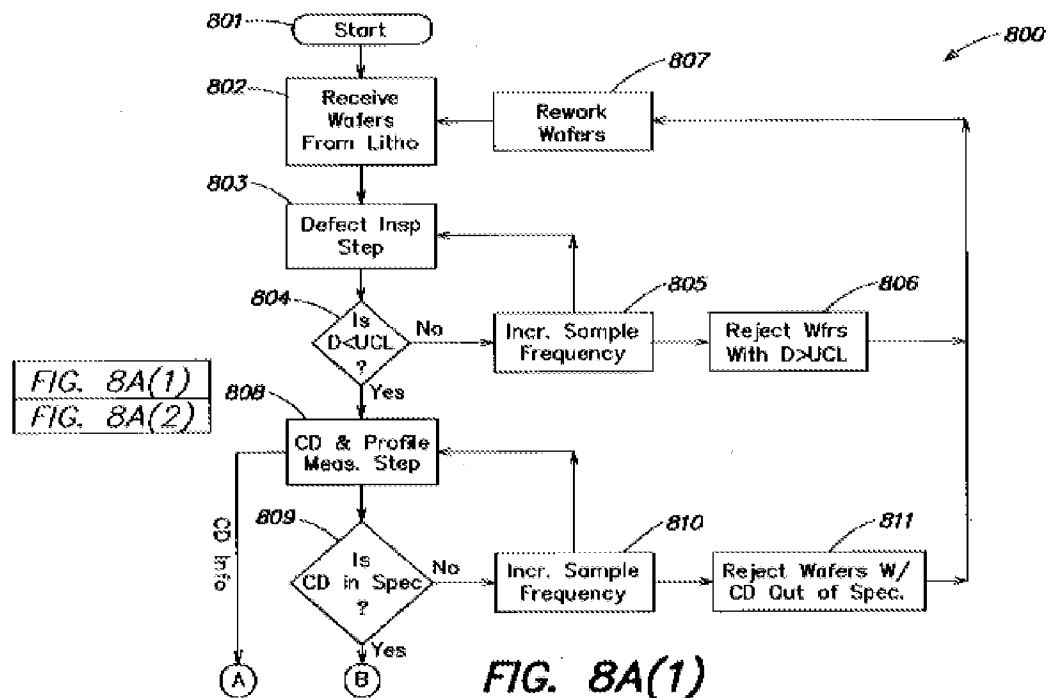
In re claim 11, as applied to claim 8 above, **Sahin** discloses all claimed limitations including the limitation wherein the system further comprising means for creating an opening **710a, 710b** having non-linear sidewalls through a layer of insulation material by applying a high-polymer based etch to the surface of the layer of insulation material **704/706** (see page 11, paragraph [0158]).

In re claim 15, **Sahin** discloses a system for creation of an opening of controllable format through a layer of insulation material, comprising:

means **102** for creating an opening **710a, 710b** through a layer of etch resist material **708** provided over the surface of a layer of insulating material **704/706** having been deposited over the surface of a substrate **702** ((page 11, paragraphs [0150]-[0152] and FIGS. 7A-C);

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means, including a feedback mechanism (see page 12, paragraph [0166]), for obtaining a critical dimension measurement of the opening created through the layer of etch resist material **708** assuring that the critical dimension measurement (CD) is within design specification (see page 16, paragraph [0210] and step **809** in FIG. 8A(1)), the feedback mechanism communicating with the means for creating an opening **710a**, **710b** through a layer of etch resist material **708** to control the critical dimension measurement (CD) of the opening **710a,710b** (see page 6, paragraph [0211] and steps 807 and 810 of FIG. 8A(1));



means for creating an opening **710a**, **710b** having non-linear sidewalls through the layer of insulation material **704/076** by applying a high-polymer based etch to the surface of the layer of insulation material **704/706** (see

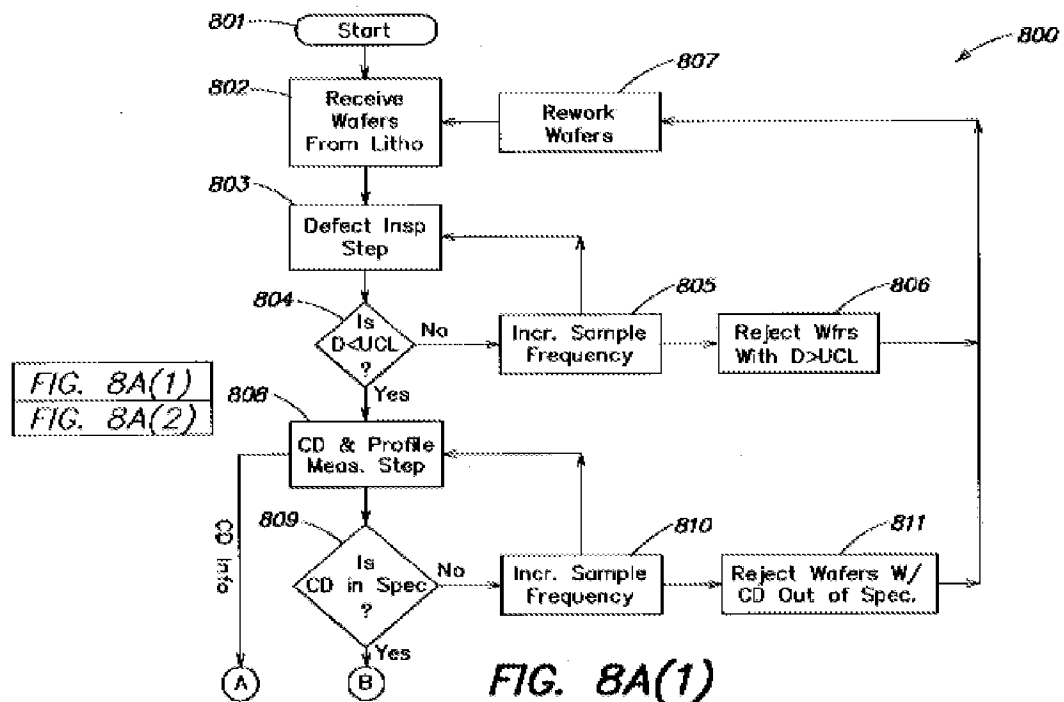
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paragraph [0158]), whereby a diameter of opening having non-linear sidewalls is dependent on a diameter of the opening created through the layer of etch resist material **708** (see page 17, paragraphs [0214]-[0215]); and

means, including a feedback mechanism, for assuring that the opening **710a, 710b** created through the layer of insulation material **704/706** is within design specification (see page 17, paragraphs [0216]-[0219]).

In re claim 16, Sahin discloses a system for creation of an opening of controllable format through a layer of insulation material, comprising:

means, including a feedback mechanism (see page 12, paragraph [0166]), for creating an opening **710a, 710b** through a layer of etch resist material **708** provided over the surface of a layer of insulating material **704/706** having been deposited over the surface of a substrate **702**, such that the opening **710a, 710b** has a critical dimension measurement (CD) that is within design specification (see page 16, paragraph [0210] and step 809 in FIG. 8A(1));



means for creating an opening **710a**, **710b** through the layer of insulation material **704/706**, whereby a diameter of layer of insulation material **704/706** is dependent on a diameter of the opening **710a**, **710b** created through the layer of etch resist material **708** (see page 17, paragraphs [0214]-[0215]); and

means, including a feedback mechanism, for assuring that the opening created through the layer of insulation material is within design specification (see page 17, paragraphs [0216]-[0219]).

In re claim 17, as applied to claim 16 above, **Sahin** discloses all claimed limitations including the limitation wherein the means, including a feedback mechanism, for creating an opening **710a**, **710b** (see page 12, paragraph [0166]) include means for making corrections to an original critical dimension

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measurement (CD) that is not within design specification (see page 17, paragraphs [0214]-[0215]).

(10) Response to Argument

I (Issue): Do Sahin et al. anticipate the claims by providing the claimed feature of controlling the critical dimension measurement by communicating with the means for creating an opening through a layer of etch resist material as reflected in independent claims 8, 15 and 16 of the present application?

R (Statute): 35 USC § 102 (e)

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

A (Analysis): Appellants argue that the cited reference, Sahin et al. (U.S. Pub. 2003/0220708), herein known as Sahin, does not anticipate the claims because Sahin fails to provide the claimed feature of controlling the critical dimension measurement by communicating with the means for creating an opening through a layer of etch resist material, i.e., (collectively) “the lithography tools”.

In response to Appellants’ contention that Sahin does not teach or suggest the claimed feature of controlling the critical dimension measurement by communicating with the means for creating an opening through a layer of etch resist material, Respondent respectfully disagrees.

Sahin specifically discloses in (page 16, paragraphs [0207]-[0211] and FIGS. 8A(1)) a flowchart of a exemplary process containing step **808** of

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measuring the critical dimension (CD) and profile of the processed wafer, step **809** of checking to assure if the critical dimension is within the design specification and if the processed wafer having a critical dimension that is out of the design specification, reject the wafer (in step **811**) and send the wafer back for rework through photolithographic tool (in steps **807**).

Sahin further discloses in (pages 16-17, paragraphs [0210]-[0212]), the process **800** proceeds to step **808** wherein the integrated inspection system **322** performs a critical dimension and profile measurement on the wafer's patterned masking layer (layer of etch resist material). The measurement system **324b** employed to measure the width, depth and profile of the features (openings) formed within the patterned masking layer. Subsequently, a module controller **114** determine if the patterned masking layer has features' widths, depths and profiles that are within the specification requirements. In case that the widths, depths or profiles of the patterned masking layer's features are not within specification, the module controller **114** may reject the wafer as being out of design specification and direct the inventive system **100** to rework the wafer (see page 16, paragraphs [0210]-[0212] and FIG. 8A(1)). Furthermore, if in step **809**, the module controller **114** determines that the patterned masking layer is within design specification, then in step **812**, the module controller **114** directs the etch tool **102** (means for creating an opening through a layer of insulation material), to perform an shallow trench isolation (STI) etch process based on the dimensions/profile of the features (openings) created through the layer of

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patterned masking layer (layer of etch resist material) (see page 17, paragraph [0212] and FIG. 8A(2)).

In view of the above, it is respectfully submitted that by measuring and inspecting to see if the width, depth and profile of the features (openings) formed within the patterned masking layer (layer of etch resist material) is within design specification before sending the processed wafer to the shallow trench isolation (STI) etch process or otherwise sending the processed wafer through rework, **Sahin** clearly teaches a feedback mechanism for assuring that the obtained critical dimension measurement of the features (openings) created through the patterned masking layer (layer of etch resist material) is within design specification, the feedback mechanism communicating with the means (lithography tool) for creating the features through the patterned masking layer to control the critical dimension measurement of the features by implementing corrections in the means for creating the features through the patterned masking layer.

Note that, by measuring, comparing data and check to see if the features (openings) created through the patterned masking layer (layer of etch resist material) is within design specification before sending to the next stage for creating features (openings) through the layer of insulation material (shallow trench isolation (STI) etch process) or rejecting the wafer that is out of design specification through rework, **Sahin** is assuring that the obtained critical dimension measurement of the features created through the patterned masking

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layer is within design specification before conveying the processed wafer to the shallow trench isolation etch process and also including feedback mechanism to send the wafer that is out of design specification back to the lithography tool to go through rework. It is further respectfully submitted that to rework the processed wafer mean to improve the processed wafer to obtain the features (openings) that created through the patterned masking layer (layer of etch resist material) that meets the design specification requirements by implementing corrections in the means for creating the features (photolithographic tool).

C. (Conclusion): Sahin et al. do anticipate the Appellants' claimed invention by providing claimed feature of controlling the critical dimension measurement by communicating with the means for creating an opening through a layer of etch resist material as reflected in independent claims 8, 15 and 16 of the present application.

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(11) Related Proceeding Appendix

None

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Khiem D. Nguyen/

July 22, 2009

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